

# The Role of Epidemiology in Food Safety Issues in Governmental Decisions and Actions

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## **Introduction**

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Since the President announced the Food Safety Initiative in 1997, numerous multi-agency initiatives, work groups, and committees have been established. Each group is struggling to gather science-based data to make regulatory and policy decisions and to guide strategic planning efforts. In many cases, there are little or no data available. Innovative and creative approaches are needed to address multi-disciplinary strategic goals in food safety and to fill knowledge gaps.

Epidemiology can provide the scientific "method" or "approach" to develop and implement strategic goals, to understand the multi-factorial complexity of food safety, and to provide science-based data for plans of action and for policy decisions. One advantage of epidemiologic approaches is that the methodology can be used along the entire continuum of food production to increase our understanding, determine risk factors, and develop interventions and strategies for prevention or control. Several areas where data are needed are : the understanding of sources, carriers, and reservoirs in the transmission of organisms; the identification of risk factors for exposure to and infection by organisms; and the standardization of sampling methodologies, diagnostics, and interpretation of the tests. Ultimately, the impact of these data on foodborne disease and public health must be determined.

## **NRI Supplement on Epidemiology**

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The importance of epidemiology as an approach to food safety is evidenced by the new supplement in the Cooperative State Research Education and Extension Service's (CSREES) National Research Initiative (NRI) grant program. This supplement program entitled, "Epidemiologic Approaches for Food Safety", requested proposals for up to \$ 1 million. This will continue to be an established funding opportunity. The request asked for multi-institutional, multi-disciplinary approaches or studies that addressed food safety along the entire food continuum. Areas of emphasis were 1) identification of sources and reservoirs of pathogenic organisms and their toxins in food, animal feed and the environment; 2) determination of the levels of microbial contamination in finished food products; 3) identification of farm-based production practices that might cause an increased prevalence of foodborne pathogens; and 4) identification of potential sites of contamination in the

processing, transportation, retail setting, and consumer use of food products. This program has exciting potential since it is the first time that large grants have been available for population studies. The importance of these epidemiologic studies in providing needed information in food safety is evident by numerous inquiries from federal agencies about this program. Part of the impact of these studies will be the ability to address emerging critical areas of food safety, e.g. antibiotic resistance. The population studies will also provide important data, not available from laboratory studies, for strategic planning efforts and for policy implementation and development.

## **Epidemiology in Other Food Safety Initiatives and Programs**

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There are several other national interagency food safety initiatives occurring where epidemiology plays a relevant role and has increased in visibility. For example, a strategic planning task force has been formed, under the President's Food Safety Council, to develop an integrated, federal strategic plan for food safety. There are 5 goal groups that will develop objectives for research, surveillance, standards and inspection, education, and a creation of a seamless food safety system under the strategic plan. Epidemiologic studies have been identified in the research goal as a way to provide data, methods, models, and measures to better understand factors in foodborne illness, to assess exposure, to develop and improve prevention/control methods, and to develop risk assessments. Epidemiology plays an important role in surveillance as well. Epidemiologic approaches, e.g. surveys and the development of databases, are being used currently. Examples would be FoodNet and the National Antimicrobial Resistance Monitoring System. New surveys have been identified to target specific areas along the food production continuum, e.g. practices or pathogens at the processing level.

The effort to develop a national seamless food safety system has fostered the "50 state" or National Food Safety System (NFSS) initiative. This is a collaborative effort among federal agencies and state and local personnel from public health and agriculture departments to coordinate food safety inspections and outbreak responses. There are 6 working groups involved: Roles and Responsibilities; Outbreak Coordination and Investigation; Information Sharing and Data Collection; Communication ; National Uniform Stan-

dards; and Laboratory Operations and Coordination. Epidemiologists are heavily involved in these efforts.

Also included in the President's Food Safety Initiative is the establishment of an Interagency Risk Assessment Consortium. This Consortium includes over 15 federal agencies that will provide guidance in the development of comprehensive comparative risk analysis approaches to assist in interagency strategic planning, to act as a "clearing-house" for risk assessments and risk models, and to provide leadership in the development of risk communication approaches for microbiological hazards and potential interventions. Epidemiology NEEDS to play an active role in risk assessments and risk models. Epidemiologic approaches are needed in the summary of existing data, identifying data gaps, and understanding what "risk" is. Epidemiologic studies can be designed to fill some of the knowledge gaps, e.g. identifying hazards.

Finally, the newest high priority federal initiative is the development of a public health action plan for antibiotic resistance. Although this effort is headed by the Department of Health and Human Services, USDA has now taken an active role in developing strategies needed for agriculture. Epidemiologic studies have been identified as an important research approach to answer questions about antibiotic resistance, e.g. the role of dose and duration in the development of antibiotic resistance, the development and transference of antibiotic resistance, and most importantly, the impact of animal antibiotic resistance on human health.

## Summary

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The understanding of epidemiology and its value is increasing in the food safety area. Epidemiologic studies have already provided important on-farm data not previously known. Epidemiology offers a way to approach important food safety questions that can not be studied in a laboratory. With the creation of the new supplement to the NRI and raised awareness in national committees and workgroups, epidemiology has gained credibility as a scientific method for food safety research and strategic planning. With this raised awareness, epidemiology needs to look for new opportunities for leadership in the food safety area. One new area that needs critical leadership is in the development and evaluation of intervention strategies (e.g. quality assurance, management practices). Innovative approaches need to be developed to evaluate the economic, animal health, and public health impact of these strategies in food safety. Finally, continued creative epidemiologic approaches are essential to answer research questions in food animal populations that have impact on foodborne disease and food safety.